

SEQUENCE LISTING

<110> Steward, Lance E.
Fernandez-Salas, Ester
Herrington, Todd
Aoki, Kei Roger

<120> Clostridial Neurotoxin Compositions and
Modified Clostridial Neurotoxins

<130> 17355CIP3 (BOT)

<140> US 10/757,077

<141> 2004-01-14

<150> US 09/910,346

<151> 2001-07-20

<150> US 09/620,840

<151> 2000-07-21

<150> US 10/163,106

<151> 2003-06-04

<160> 148

<170> FastSEQ for Windows Version 4.0

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<213> Clostridium botulinum serotype A

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Phe Glu Phe Tyr Lys Leu Leu

1

5

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<212> PRT

<213> Rattus norvegicus

<400> 2

Glu Glu Lys Arg Ala Ile Leu

1

5

<210> 3

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<212> PRT

<213> Rattus norvegicus

<400> 3

Glu Glu Lys Met Ala Ile Leu
1 5

<210> 4

<211> 7

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<213> Rattus norvegicus

<400> 4

Ser Glu Arg Asp Val Leu Leu
1 5

<210> 5

<211> 7

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<213> Rattus norvegicus

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Val Asp Thr Gln Val Leu Leu
1 5

<210> 6

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<213> Mus musculus

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Ala Glu Val Gln Ala Leu Leu
1 5

<210> 7

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<213> Xenopus laevis

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Ser Asp Lys Gln Asn Leu Leu
1 5

<210> 8

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<213> Gallus gallus

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Ser Asp Arg Gln Asn Leu Ile
1 5

<210> 9
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<213> *Ovis aries*

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Ala Asp Thr Gln Val Leu Met
1 5

<210> 10
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<213> *Homo sapiens*

<400> 10
Ser Asp Lys Asn Thr Leu Leu
1 5

<210> 11
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<400> 11
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1 5

<210> 12
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<400> 12
Ala Asp Thr Gln Ala Leu Leu
1 5

<210> 13
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<213> *Saccharomyces cerevisiae*

<400> 13
Asn Glu Gln Ser Pro Leu Leu
1 5

<210> 14
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<213> *Clostridium botulinum* serotype A

<400> 14

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp
1 5 10

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<211> 11

<212> PRT

<213> Clostridium botulinum serotype A

<400> 15

Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp
1 5 10

<210> 16

<211> 4

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<400> 16

Met Tyr Lys Asp
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<210> 17

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<213> Artificial Sequence

<220>

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<222> (1)...(7)

<223> Consensus sequence for Leucine-based motif.

<221> VARIANT

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<223> Xaa is any amino acid.

<221> VARIANT

<222> (3)...(5)

<223> Xaa is any amino acid.

<400> 17

Xaa Asp Xaa Xaa Xaa Leu Leu
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Xaa Glu Xaa Xaa Xaa Leu Leu

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<400> 19

Xaa Asp Xaa Xaa Xaa Leu Ile

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<400> 20

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1 5

<210> 21

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<400> 21

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<210> 22

<211> 7

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<223> Xaa is any amino acid.

<400> 22

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<210> 23

<211> 7

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<400> 23
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<223> Consensus sequence for Tyrosine-based motif.

<221> VARIANT
<222> (2)...(3)
<223> Xaa is any amino acid.

<221> VARIANT
<222> (4)...(4)
<223> Xaa is any hydrophobic amino acid.

<400> 24
Tyr Xaa Xaa Xaa
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<210> 25
<211> 50
<212> PRT
<213> Artificial Sequence

<220>
<221> PEPTIDE
<222> (1)...(50)
<223> Peptide comprising a 6x His tag and S-tag

<400> 25

Met His His His His His His Ser Ser Gly Leu Val Pro Arg Gly Ser
1 5 10 15
Gly Met Lys Glu Thr Ala Ala Ala Lys Phe Glu Arg Gln His Met Asp
20 25 30
Ser Pro Asp Leu Gly Thr Asp Asp Asp Lys Ala Met Tyr Lys Asp
35 40 45
Pro Val
50

<210> 26
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<221> PEPTIDE
<222> (1)...(14)
<223> Peptide comprising a 6x His tag

<400> 26
Asn Phe Thr Lys Leu Thr Arg Ala His His His His His His
1 5 10

<210> 27
<211> 8
<212> PRT
<213> Clostridium botulinum serotype A

<400> 27
Pro Phe Val Asn Lys Gln Phe Asn
1 5

<210> 28
<211> 22
<212> PRT
<213> Clostridium botulinum sertotype A

<400> 28
Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg
1 5 10 15
Gly Ile Ile Thr Ser Lys
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<210> 29
<211> 438
<212> PRT
<213> Clostridium botulinum sertotype A

<400> 29
Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly
1 5 10 15

Val	Asp	Ile	Ala	Tyr	Ile	Lys	Ile	Pro	Asn	Ala	Gly	Gln	Met	Gln	Pro
			20					25					30		
Val	Lys	Ala	Phe	Lys	Ile	His	Asn	Lys	Ile	Trp	Val	Ile	Pro	Glu	Arg
	35						40					45			
Asp	Thr	Phe	Thr	Asn	Pro	Glu	Gly	Asp	Leu	Asn	Pro	Pro	Pro	Glu	
	50					55				60					
Ala	Lys	Gln	Val	Pro	Val	Ser	Tyr	Tyr	Asp	Ser	Thr	Tyr	Leu	Ser	Thr
	65				70					75					80
Asp	Asn	Glu	Lys	Asp	Asn	Tyr	Leu	Lys	Gly	Val	Thr	Lys	Leu	Phe	Glu
				85					90					95	
Arg	Ile	Tyr	Ser	Thr	Asp	Leu	Gly	Arg	Met	Leu	Leu	Thr	Ser	Ile	Val
			100					105					110		
Arg	Gly	Ile	Pro	Phe	Trp	Gly	Gly	Ser	Thr	Ile	Asp	Thr	Glu	Leu	Lys
	115						120					125			
Val	Ile	Asp	Thr	Asn	Cys	Ile	Asn	Val	Ile	Gln	Pro	Asp	Gly	Ser	Tyr
	130					135					140				
Arg	Ser	Glu	Glu	Leu	Asn	Leu	Val	Ile	Ile	Gly	Pro	Ser	Ala	Asp	Ile
	145				150					155					160
Ile	Gln	Phe	Glu	Cys	Lys	Ser	Phe	Gly	His	Glu	Val	Leu	Asn	Leu	Thr
				165					170					175	
Arg	Asn	Gly	Tyr	Gly	Ser	Thr	Gln	Tyr	Ile	Arg	Phe	Ser	Pro	Asp	Phe
		180						185					190		
Thr	Phe	Gly	Phe	Glu	Glu	Ser	Leu	Glu	Val	Asp	Thr	Asn	Pro	Leu	Leu
	195						200					205			
Gly	Ala	Gly	Lys	Phe	Ala	Thr	Asp	Pro	Ala	Val	Thr	Leu	Ala	His	Glu
	210					215					220				
Leu	Ile	His	Ala	Gly	His	Arg	Leu	Tyr	Gly	Ile	Ala	Ile	Asn	Pro	Asn
	225				230					235					240
Arg	Val	Phe	Lys	Val	Asn	Thr	Asn	Ala	Tyr	Tyr	Glu	Met	Ser	Gly	Leu
			245						250					255	
Glu	Val	Ser	Phe	Glu	Glu	Leu	Arg	Thr	Phe	Gly	Gly	His	Asp	Ala	Lys
			260					265					270		
Phe	Ile	Asp	Ser	Leu	Gln	Glu	Asn	Glu	Phe	Arg	Leu	Tyr	Tyr	Tyr	Asn
		275					280					285			
Lys	Phe	Lys	Asp	Ile	Ala	Ser	Thr	Leu	Asn	Lys	Ala	Lys	Ser	Ile	Val
	290					295					300				
Gly	Thr	Thr	Ala	Ser	Leu	Gln	Tyr	Met	Lys	Asn	Val	Phe	Lys	Glu	Lys
	305				310					315					320
Tyr	Leu	Leu	Ser	Glu	Asp	Thr	Ser	Gly	Lys	Phe	Ser	Val	Asp	Lys	Leu
			325						330					335	
Lys	Phe	Asp	Lys	Leu	Tyr	Lys	Met	Leu	Thr	Glu	Ile	Tyr	Thr	Glu	Asp
		340						345					350		
Asn	Phe	Val	Lys	Phe	Phe	Lys	Val	Leu	Asn	Arg	Lys	Thr	Tyr	Leu	Asn
		355					360					365			
Phe	Asp	Lys	Ala	Val	Phe	Lys	Ile	Asn	Ile	Val	Pro	Lys	Val	Asn	Tyr
	370					375					380				
Thr	Ile	Tyr	Asp	Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn
	385				390					395					400
Phe	Asn	Gly	Gln	Asn	Thr	Glu	Ile	Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu
			405						410					415	
Lys	Asn	Phe	Thr	Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Leu	Leu	Cys	Val	Arg
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Gly	Ile	Ile	Thr	Ser	Lys										
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<210> 30
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 <213> Clostridium botulinum sertotype B

<400> 30
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 1 5 10 15
 Asn Asn Ile Ile Met Met Glu Pro Pro Phe Ala Arg Gly Thr Gly Arg
 20 25 30
 Tyr Tyr Lys Ala Phe Lys Ile Thr Asp Arg Ile Trp Ile Ile Pro Glu
 35 40 45
 Arg Tyr Thr Phe Gly Tyr Lys Pro Glu Asp Phe Asn Lys Ser Ser Gly
 50 55 60
 Ile Phe Asn Arg Asp Val Cys Glu Tyr Tyr Asp Pro Asp Tyr Leu Asn
 65 70 75 80
 Thr Asn Asp Lys Lys Asn Ile Phe Leu Gln Thr Met Ile Lys Leu Phe
 85 90 95
 Asn Arg Ile Lys Ser Lys Pro Leu Gly Glu Lys Leu Leu Glu Met Ile
 100 105 110
 Ile Asn Gly Ile Pro Tyr Leu Gly Asp Arg Arg Val Pro Leu Glu Glu
 115 120 125
 Phe Asn Thr Asn Ile Ala Ser Val Thr Val Asn Lys Leu Ile Ser Asn
 130 135 140
 Pro Gly Glu Val Glu Arg Lys Lys Gly Ile Phe Ala Asn Leu Ile Ile
 145 150 155 160
 Phe Gly Pro Gly Pro Val Leu Asn Glu Asn Glu Thr Ile Asp Ile Gly
 165 170 175
 Ile Gln Asn His Phe Ala Ser Arg Glu Gly Phe Gly Gly Ile Met Gln
 180 185 190
 Met Lys Phe Cys Pro Glu Tyr Val Ser Val Phe Asn Asn Val Gln Glu
 195 200 205
 Asn Lys Gly Ala Ser Ile Phe Asn Arg Arg Gly Tyr Phe Ser Asp Pro
 210 215 220
 Ala Leu Ile Leu Met His Glu Leu Ile His Val Leu His Gly Leu Tyr
 225 230 235 240
 Gly Ile Lys Val Asp Asp Leu Pro Ile Val Pro Asn Glu Lys Lys Phe
 245 250 255
 Phe Met Gln Ser Thr Asp Ala Ile Gln Ala Glu Glu Leu Tyr Thr Phe
 260 265 270
 Gly Gly Gln Asp Pro Ser Ile Ile Thr Pro Ser Thr Asp Lys Ser Ile
 275 280 285
 Tyr Asp Lys Val Leu Gln Asn Phe Arg Gly Ile Val Asp Arg Leu Asn
 290 295 300
 Lys Val Leu Val Cys Ile Ser Asp Pro Asn Ile Asn Ile Asn Ile Tyr
 305 310 315 320
 Lys Asn Lys Phe Lys Asp Lys Tyr Lys Phe Val Glu Asp Ser Glu Gly
 325 330 335
 Lys Tyr Ser Ile Asp Val Glu Ser Phe Asp Lys Leu Tyr Lys Ser Leu
 340 345 350
 Met Phe Gly Phe Thr Glu Thr Asn Ile Ala Glu Asn Tyr Lys Ile Lys
 355 360 365
 Thr Arg Ala Ser Tyr Phe Ser Asp Ser Leu Pro Pro Val Lys Ile Lys
 370 375 380

Asn Leu Leu Asp Asn Glu Ile Tyr Thr Ile Glu Glu Gly Phe Asn Ile
385 390 395 400
Ser Asp Lys Asp Met Glu Lys Glu Tyr Arg Gly Gln Asn Lys Ala Ile
405 410 415
Asn Lys Gln Ala Tyr Glu Glu Ile Ser Lys Glu His Leu Ala Val Tyr
420 425 430
Lys Ile Gln Met Cys Lys Ser Val Lys
435 440

<210> 31
<211> 4
<212> PRT
<213> Clostridium botulinum serotype A

<220>
<221> PHOSPHORYLATION
<222> (1)...(4)
<223> Tyrosine-based motif

<400> 31
Tyr Ile Lys Ile
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<210> 32
<211> 4
<212> PRT
<213> Clostridium botulinum serotype A

<220>
<221> PHOSPHORYLATION
<222> (1)...(4)
<223> Tyrosine-based motif

<400> 32
Tyr Asp Ser Thr
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<210> 33
<211> 4
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<213> Clostridium botulinum serotype A

<220>
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<222> (1)...(4)
<223> Tyrosine-based motif

<400> 33
Tyr Gly Ser Thr
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<210> 34
<211> 4
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<213> Clostridium botulinum serotype A

<220>
<221> PHOSPHORYLATION
<222> (1)...(4)
<223> Tyrosine-based motif

<400> 34
Tyr Asn Lys Phe
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<210> 35
<211> 4
<212> PRT
<213> Clostridium botulinum serotype A

<220>
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<222> (1)...(4)
<223> Tyrosine-based motif

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Tyr Met Lys Asn
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<220>
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<223> Tyrosine-based motif

<400> 36
Tyr Leu Asn Phe
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<210> 37
<211> 4
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<220>
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<400> 37

Tyr Asp Gly Phe

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<210> 38

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<220>

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<222> (1)...(4)

<223> Tyrosine-based motif

<400> 38

Tyr Lys Leu Leu

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<210> 39

<211> 30

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<400> 39

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly

1

5

10

15

Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met

20

25

30

<210> 40

<211> 50

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<400> 40

Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln

1

5

10

15

Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr

20

25

30

Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr

35

40

45

Ser Lys

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<210> 41
<211> 30
<212> PRT
<213> Clostridium botulinum serotype B

<220>
<221> DOMAIN
<222> (13)...(30)
<223> Amino terminal 30 amino acids of light chain

<400> 41
Met Pro Val Thr Ile Asn Asn Phe Asn Tyr Asn Asp Pro Ile Asp Asn
1 5 10 15
Asp Asn Ile Ile Met Met Glu Pro Pro Phe Ala Arg Gly Thr
20 25 30

<210> 42
<211> 50
<212> PRT
<213> Clostridium botulinum serotype B

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<400> 42
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys
1 5 10 15
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu Glu
20 25 30
Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Gln Met Cys Lys Ser
35 40 45
Val Lys
50

<210> 43
<211> 30
<212> PRT
<213> Clostridium botulinum serotype C1

<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

<400> 43
Met Pro Ile Thr Ile Asn Asn Phe Asn Tyr Ser Asp Pro Val Asp Asn
1 5 10 15
Lys Asn Ile Leu Tyr Leu Asp Thr His Leu Asn Thr Leu Ala

20

25

30

<210> 44
<211> 50
<212> PRT
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<220>
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<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<400> 44
Asn Ile Pro Lys Ser Asn Leu Asn Val Leu Phe Met Gly Gln Asn Leu
1 5 10 15
Ser Arg Asn Pro Ala Leu Arg Lys Val Asn Pro Glu Asn Met Leu Tyr
20 25 30
Leu Phe Thr Lys Phe Cys His Lys Ala Ile Asp Gly Arg Ser Leu Tyr
35 40 45
Asn Lys
50

<210> 45
<211> 30
<212> PRT
<213> Clostridium botulinum serotype D

<220>
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<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

<400> 45
Met Thr Trp Pro Val Lys Asp Phe Asn Tyr Ser Asp Pro Val Asn Asp
1 5 10 15
Asn Asp Ile Leu Tyr Leu Arg Ile Pro Gln Asn Lys Leu Ile
20 25 30

<210> 46
<211> 50
<212> PRT
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<220>
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<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<400> 46
Tyr Thr Ile Arg Asp Gly Phe Asn Leu Thr Asn Lys Gly Phe Asn Ile
1 5 10 15
Glu Asn Ser Gly Gln Asn Ile Glu Arg Asn Pro Ala Leu Gln Lys Leu

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          20          25          30
Ser Ser Glu Ser Val Val Asp Leu Phe Thr Lys Val Cys Leu Arg Leu
      35          40          45
Thr Lys
      50

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<210> 47
<211> 30
<212> PRT
<213> Clostridium botulinum serotype E

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<220>
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<223> Amino terminal 30 amino acid of light chain

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<400> 47
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
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Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr
      20          25          30

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<210> 48
<211> 50
<212> PRT
<213> Clostridium botulinum serotype E

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<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

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<400> 48
Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala
  1          5          10          15
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val
      20          25          30
Lys Lys Ile Ile Arg Phe Cys Lys Asn Ile Val Ser Val Lys Gly Ile
      35          40          45
Arg Lys
      50

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<210> 49
<211> 30
<212> PRT
<213> Clostridium botulinum serotype F

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<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

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<400> 49

Met	Pro	Val	Ala	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Pro	Val	Asn	Asp
1				5				10					15		
Asp	Thr	Ile	Leu	Tyr	Met	Gln	Ile	Pro	Tyr	Glu	Glu	Lys	Ser		
			20					25					30		

<210> 50

<211> 50

<212> PRT

<213> Clostridium botulinum serotype F

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<400> 50

Thr	Val	Ser	Glu	Gly	Phe	Asn	Ile	Gly	Asn	Leu	Ala	Val	Asn	Asn	Arg
1				5				10					15		
Gly	Gln	Ser	Ile	Lys	Leu	Asn	Pro	Lys	Ile	Ile	Asp	Ser	Ile	Pro	Asp
			20					25					30		
Lys	Gly	Leu	Val	Glu	Lys	Ile	Val	Lys	Phe	Cys	Lys	Ser	Val	Ile	Pro
		35					40					45			
Arg	Lys														
	50														

<210> 51

<211> 30

<212> PRT

<213> Clostridium botulinum serotype G

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<400> 51

Met	Pro	Val	Asn	Ile	Lys	Asn	Phe	Asn	Tyr	Asn	Asp	Pro	Ile	Asn	Asn
1				5				10					15		
Asp	Asp	Ile	Ile	Met	Met	Glu	Pro	Phe	Asn	Asp	Pro	Gly	Pro		
			20					25					30		

<210> 52

<211> 50

<212> PRT

<213> Clostridium botulinum serotype G

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<400> 52

Gln Asn Glu Gly Phe Asn Ile Ala Ser Lys Asn Leu Lys Thr Glu Phe
 1 5 10 15
 Asn Gly Gln Asn Lys Ala Val Asn Lys Glu Ala Tyr Glu Glu Ile Ser
 20 25 30
 Leu Glu His Leu Val Ile Tyr Arg Ile Ala Met Cys Lys Pro Val Met
 35 40 45
 Tyr Lys
 50

<210> 53

<211> 30

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (4)...(4)

<223> Alanine substitution

<400> 53

Met Pro Phe Ala Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly
 1 5 10 15
 Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met
 20 25 30

<210> 54

<211> 50

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (25)...(25)

<223> Arginine substitution

<400> 54

Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln
 1 5 10 15
 Asn Thr Glu Ile Asn Asn Met Asn Arg Thr Lys Leu Lys Asn Phe Thr
 20 25 30
 Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr
 35 40 45
 Ser Lys
 50

<210> 55
<211> 30
<212> PRT
<213> Clostridium botulinum serotype A

<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT
<222> (10)...(10)
<223> Lysine substitution

<400> 55
Met Pro Phe Val Asn Lys Gln Phe Asn Lys Lys Asp Pro Val Asn Gly
1 5 10 15
Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met
20 25 30

<210> 56
<211> 50
<212> PRT
<213> Clostridium botulinum serotype A

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT
<222> (31)...(31)
<223> Alanine substitution

<221> VARIANT
<222> (32)...(32)
<223> Alanine substitution

<400> 56
Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln
1 5 10 15
Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Ala Ala
20 25 30
Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr
35 40 45
Ser Lys
50

<210> 57
<211> 30
<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (21)...(21)

<223> Arginine substitution

<400> 57

Met	Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly
1				5				10					15		
Val	Asp	Ile	Ala	Arg	Ile	Lys	Ile	Pro	Asn	Ala	Gly	Gln	Met		
		20				25						30			

<210> 58

<211> 50

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (13)...(13)

<223> Histidine substitution

<400> 58

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	His	Asn	Gly	Gln
1			5				10				15				
Asn	Thr	Glu	Ile	Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr
		20				25					30				
Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Leu	Leu	Cys	Val	Arg	Gly	Ile	Ile	Thr
		35				40					45				
Ser	Lys														
	50														

<210> 59

<211> 30

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (7)...(7)

<223> Histidine substitution

<400> 59

Met	Pro	Phe	Val	Asn	Lys	His	Phe	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly
1				5				10						15	
Val	Asp	Ile	Ala	Tyr	Ile	Lys	Ile	Pro	Asn	Ala	Gly	Gln	Met		
			20					25					30		

<210> 60

<211> 50

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (43)...(43)

<223> Alanine substitution

<400> 60

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln
1				5				10						15	
Asn	Thr	Glu	Ile	Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr
			20				25					30			
Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Leu	Leu	Cys	Ala	Arg	Gly	Ile	Ile	Thr
		35					40					45			
Ser	Lys														
	50														

<210> 61

<211> 30

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (3)...(3)

<223> Alanine substitution

<400> 61

Met	Pro	Ala	Thr	Ile	Asn	Asn	Phe	Asn	Tyr	Asn	Asp	Pro	Ile	Asp	Asn
1				5				10						15	
Asp	Asn	Ile	Ile	Met	Met	Glu	Pro	Pro	Phe	Ala	Arg	Gly	Thr		
			20					25					30		

<210> 62
<211> 50
<212> PRT
<213> Clostridium botulinum serotype B

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT
<222> (44)...(44)
<223> Arginine substitution

<400> 62
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys
1 5 10 15
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu Glu
20 25 30
Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Arg Met Cys Lys Ser
35 40 45
Val Lys
50

<210> 63
<211> 30
<212> PRT
<213> Clostridium botulinum serotype B

<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT
<222> (21)...(21)
<223> Alanine substitution

<221> VARIANT
<222> (22)...(22)
<223> Alanine substitution

<400> 63
Met Pro Val Thr Ile Asn Asn Phe Asn Tyr Asn Asp Pro Ile Asp Asn
1 5 10 15
Asp Asn Ile Ile Ala Ala Glu Pro Pro Phe Ala Arg Gly Thr
20 25 30

<210> 64
<211> 50
<212> PRT
<213> Clostridium botulinum serotype B

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT
<222> (41)...(41)
<223> Arginine substitution

<400> 64
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys
1 5 10 15
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu Glu
20 25 30
Ile Ser Lys Glu His Leu Ala Val Arg Lys Ile Gln Met Cys Lys Ser
35 40 45
Val Lys
50

<210> 65
<211> 30
<212> PRT
<213> Clostridium botulinum serotype B

<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT
<222> (10)...(10)
<223> Arginine substitution

<400> 65
Met Pro Val Thr Ile Asn Asn Phe Asn Arg Asn Asp Pro Ile Asp Asn
1 5 10 15
Asp Asn Ile Ile Met Met Glu Pro Pro Phe Ala Arg Gly Thr
20 25 30

<210> 66
<211> 50
<212> PRT
<213> Clostridium botulinum serotype B

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT
<222> (30)...(30)
<223> Lysine substitution

<400> 66

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Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys
 1           5           10           15
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Lys Glu Glu
          20           25           30
Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Gln Met Cys Lys Ser
          35           40           45
Val Lys
    50

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<210> 67

<211> 30

<212> PRT

<213> Clostridium botulinum serotype C1

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (8)...(8)

<223> Lysine substitution

<400> 67

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Met Pro Ile Thr Ile Asn Asn Lys Asn Tyr Ser Asp Pro Val Asp Asn
 1           5           10           15
Lys Asn Ile Leu Tyr Leu Asp Thr His Leu Asn Thr Leu Ala
          20           25           30

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<210> 68

<211> 50

<212> PRT

<213> Clostridium botulinum serotype C1

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (48)...(48)

<223> Arginine substitution

<400> 68

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Asn Ile Pro Lys Ser Asn Leu Asn Val Leu Phe Met Gly Gln Asn Leu
 1           5           10           15
Ser Arg Asn Pro Ala Leu Arg Lys Val Asn Pro Glu Asn Met Leu Tyr
          20           25           30
Leu Phe Thr Lys Phe Cys His Lys Ala Ile Asp Gly Arg Ser Leu Arg
          35           40           45
Asn Lys
    50

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<210> 69
<211> 30
<212> PRT
<213> Clostridium botulinum serotype D

<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT
<222> (5)...(5)
<223> Alanine substitution

<221> VARIANT
<222> (14)...(14)
<223> Alanine substitution

<400> 69
Met Thr Trp Pro Ala Lys Asp Phe Asn Tyr Ser Asp Pro Ala Asn Asp
1 5 10 15
Asn Asp Ile Leu Tyr Leu Arg Ile Pro Gln Asn Lys Leu Ile
20 25 30

<210> 70
<211> 50
<212> PRT
<213> Clostridium botulinum serotype D

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT
<222> (44)...(44)
<223> Alanine substitution

<400> 70
Tyr Thr Ile Arg Asp Gly Phe Asn Leu Thr Asn Lys Gly Phe Asn Ile
1 5 10 15
Glu Asn Ser Gly Gln Asn Ile Glu Arg Asn Pro Ala Leu Gln Lys Leu
20 25 30
Ser Ser Glu Ser Val Val Asp Leu Phe Thr Lys Ala Cys Leu Arg Leu
35 40 45
Thr Lys
50

<210> 71
<211> 30
<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (13)...(13)

<223> Alanine substitution

<400> 71

Met	Pro	Lys	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Pro	Ala	Asn	Asp	Arg
1				5				10					15		
Thr	Ile	Leu	Tyr	Ile	Lys	Pro	Gly	Gly	Cys	Gln	Glu	Phe	Tyr		
			20				25						30		

<210> 72

<211> 50

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (31)...(31)

<223> Histidine substitution

<400> 72

Gly	Tyr	Asn	Ile	Asn	Asn	Leu	Lys	Val	Asn	Phe	Arg	Gly	Gln	Asn	Ala
1				5				10					15		
Asn	Leu	Asn	Pro	Arg	Ile	Ile	Thr	Pro	Ile	Thr	Gly	Arg	Gly	His	Val
			20				25					30			
Lys	Lys	Ile	Ile	Arg	Phe	Cys	Lys	Asn	Ile	Val	Ser	Val	Lys	Gly	Ile
		35				40				45					
Arg	Lys														
	50														

<210> 73

<211> 30

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (7)...(7)

<223> Arginine substitution

<400> 73

Met	Pro	Lys	Ile	Asn	Ser	Arg	Asn	Tyr	Asn	Asp	Pro	Val	Asn	Asp	Arg
1				5					10				15		
Thr	Ile	Leu	Tyr	Ile	Lys	Pro	Gly	Gly	Cys	Gln	Glu	Phe	Tyr		
		20					25						30		

<210> 74

<211> 50

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(50)

<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT

<222> (42)...(42)

<223> Alanine substitution

<221> VARIANT

<222> (43)...(43)

<223> Alanine substitution

<400> 74

Gly	Tyr	Asn	Ile	Asn	Asn	Leu	Lys	Val	Asn	Phe	Arg	Gly	Gln	Asn	Ala
1				5					10					15	
Asn	Leu	Asn	Pro	Arg	Ile	Ile	Thr	Pro	Ile	Thr	Gly	Arg	Gly	Leu	Val
		20					25					30			
Lys	Lys	Ile	Ile	Arg	Phe	Cys	Lys	Asn	Ala	Ala	Ser	Val	Lys	Gly	Ile
		35					40					45			
Arg	Lys														
	50														

<210> 75

<211> 30

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> DOMAIN

<222> (1)...(30)

<223> Amino terminal 30 amino acids of light chain

<221> VARIANT

<222> (30)...(30)

<223> Arginine substitution

<400> 75

Met	Pro	Lys	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Pro	Val	Asn	Asp	Arg
1				5					10				15		

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Arg
20 25 30

<210> 76
<211> 50
<212> PRT
<213> Clostridium botulinum serotype E

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT
<222> (45)...(45)
<223> Alanine substitution

<400> 76
Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala
1 5 10 15
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val
20 25 30
Lys Lys Ile Ile Arg Phe Cys Lys Asn Ile Val Ser Ala Lys Gly Ile
35 40 45
Arg Lys
50

<210> 77
<211> 30
<212> PRT
<213> Clostridium botulinum serotype F

<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT
<222> (3)...(3)
<223> Alanine substitution

<400> 77
Met Pro Ala Ala Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp
1 5 10 15
Asp Thr Ile Leu Tyr Met Gln Ile Pro Tyr Glu Glu Lys Ser
20 25 30

<210> 78
<211> 50
<212> PRT
<213> Clostridium botulinum serotype F

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT
<222> (46)...(46)
<223> Alanine substitution

<400> 78
Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu Ala Val Asn Asn Arg
1 5 10 15
Gly Gln Ser Ile Lys Leu Asn Pro Lys Ile Ile Asp Ser Ile Pro Asp
20 25 30
Lys Gly Leu Val Glu Lys Ile Val Lys Phe Cys Lys Ser Ala Ile Pro
35 40 45
Arg Lys
50

<210> 79
<211> 30
<212> PRT
<213> Clostridium botulinum serotype G

<220>
<221> DOMAIN
<222> (1)...(30)
<223> Amino terminal 30 amino acids of light chain

<221> VARIANT
<222> (8)...(8)
<223> Histidine substitution

<400> 79
Met Pro Val Asn Ile Lys Asn His Asn Tyr Asn Asp Pro Ile Asn Asn
1 5 10 15
Asp Asp Ile Ile Met Met Glu Pro Phe Asn Asp Pro Gly Pro
20 25 30

<210> 80
<211> 50
<212> PRT
<213> Clostridium botulinum serotype G

<220>
<221> DOMAIN
<222> (1)...(50)
<223> Carboxyl terminal 50 amino acids of light chain

<221> VARIANT
<222> (47)...(47)
<223> Alanine substitution

<400> 80

Gln	Asn	Glu	Gly	Phe	Asn	Ile	Ala	Ser	Lys	Asn	Leu	Lys	Thr	Glu	Phe
1				5					10					15	
Asn	Gly	Gln	Asn	Lys	Ala	Val	Asn	Lys	Glu	Ala	Tyr	Glu	Glu	Ile	Ser
		20						25				30			
Leu	Glu	His	Leu	Val	Ile	Tyr	Arg	Ile	Ala	Met	Cys	Lys	Pro	Ala	Met
		35					40					45			
Tyr	Lys														
	50														

<210> 81

<211> 26

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(26)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 81

Met	Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly
1				5					10					15	
Val	Asp	Ile	Ala	Tyr	Ile	Lys	Ile	Pro	His						
		20					25								

<210> 82

<211> 43

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(43)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 82

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln
1				5					10					15	
Asn	Thr	Glu	Ile	Asn	Asn	Met	Asn	Ala	Ala	Ala	Ala	Ala	Ala	Ala	Ala
		20					25					30			
Ala	Ala	Cys	Val	Arg	Gly	Ile	Ile	Thr	Ser	Lys					
		35				40									

<210> 83

<211> 26

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(26)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 83

Met	Ala	Ala	Ala	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly	Val	Asp	Ile	Ala
1				5				10						15	
Tyr	Ile	Lys	Ile	Pro	Asn	Ala	Gly	Gln	Met						
		20					25								

<210> 84

<211> 48

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(48)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 84

Gly	Lys	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln
1				5				10						15	
Asn	Thr	Glu	Ile	Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr
		20					25					30			
Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Cys	Val	Arg	Gly	Ile	Ile	Thr	Ser	Lys
		35					40					45			

<210> 85

<211> 26

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(26)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 85

Met	Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly
1				5				10						15	
Val	Asp	Ile	Ala	Arg	Asn	Ala	Gly	Gln	Met						
		20					25								

<210> 86

<211> 46

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(46)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 86

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	His	Asn	Thr	Glu	Ile
1				5					10					15	
Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr	Gly	Leu	Phe	Glu
			20					25					30		
Phe	Tyr	Lys	Leu	Leu	Cys	Val	Arg	Gly	Ile	Ile	Thr	Ser	Lys		
		35					40					45			

<210> 87

<211> 26

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(26)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 87

Met	Pro	Lys	Val	Asn	Lys	Gln	Phe	Asn	Val	Asn	Gly	Val	Asp	Ile	Ala
1				5				10						15	
Tyr	Ile	Lys	Ile	Pro	Asn	Ala	Gly	Gln	Met						
			20				25								

<210> 88

<211> 42

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(42)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 88

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln
1				5					10					15	
Asn	Thr	Glu	Ile	Asn	Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr
			20				25					30			
Gly	Leu	Phe	Glu	Phe	Arg	Arg	Thr	Ser	Lys						
		35					40								

<210> 89

<211> 30

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(30)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 89

Met	Pro	Val	Thr	Ile	Asn	Asn	Phe	Asn	Tyr	Asn	Asp	Pro	Ile	Asp	Asn
1				5				10					15		
Asp	Asn	Ile	Ile	Ala	Ala	Ala	Ala	Ala	Ala	Arg	Gly	Thr			
			20				25					30			

<210> 90

<211> 37

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(37)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 90

Tyr	Thr	Ile	Pro	Pro	Gly	Phe	Asn	Ile	Ser	Asp	Lys	Asn	Met	Gly	Lys
1				5				10					15		
Glu	Tyr	Arg	Gly	Gln	Asn	Lys	Ala	Ile	Asn	Lys	Gln	Ala	Tyr	Glu	Glu
			20				25					30			
Ile	Ser	Lys	Glu	His											
			35												

<210> 91

<211> 26

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(26)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 91

Met	Pro	Ala	Phe	Asn	Tyr	Asn	Asp	Pro	Ile	Asp	Asn	Asp	Asn	Ile	Ile
1				5				10					15		
Met	Met	Glu	Pro	Pro	Phe	Ala	Arg	Gly	Thr						
			20				25								

<210> 92

<211> 50

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(50)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 92

Tyr	Thr	Ile	Glu	Glu	Gly	Phe	Asn	Ile	Ser	Asp	Lys	Asn	Met	Gly	Lys
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 5 10 15
Glu Tyr Arg Gly Gln Asn Lys Ala Ala Ala Ala Ala Glu Glu
20 25 30
Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Gln Met Cys Lys Ser
35 40 45
Val Lys
50

<210> 93
<211> 20
<212> PRT
<213> Clostridium botulinum serotype B

<220>
<221> VARIANT
<222> (1)...(20)
<223> Variant of amino-terminal 30 amino acids of LC

<400> 93
Met Pro Val Thr Ile Asn Asn Phe Asn Arg Met Met Glu Pro Pro Phe
1 5 10 15
Ala Arg Gly Thr
20

<210> 94
<211> 44
<212> PRT
<213> Clostridium botulinum serotype B

<220>
<221> VARIANT
<222> (1)...(44)
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 94
Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly Lys
1 5 10 15
Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Ala Ala
20 25 30
Ala Ala Ala Ala Ile Gln Met Cys Lys Ser Val Lys
35 40

<210> 95
<211> 21
<212> PRT
<213> Clostridium botulinum serotype C1

<220>
<221> VARIANT
<222> (1)...(21)
<223> Variant of amino-terminal 30 amino acids of LC

<400> 95

Met	Ser	Asp	Pro	Val	Asp	Asn	Lys	Asn	Ile	Leu	Tyr	Leu	Asp	Thr	His
1				5					10					15	
Leu	Asn	Thr	Leu	Ala											
				20											

<210> 96

<211> 47

<212> PRT

<213> Clostridium botulinum serotype C1

<220>

<221> VARIANT

<222> (1)...(47)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 96

Asn	Ile	Pro	Lys	Ser	Asn	Leu	Asn	Val	Leu	Phe	Met	Gly	Gln	Asn	Leu
1				5					10					15	
Ser	Arg	Asn	Pro	Ala	Leu	Arg	Lys	Val	Asn	Pro	Glu	Asn	Met	Leu	Ala
			20					25					30		
Ala	Ala	Cys	His	Lys	Ala	Ile	Asp	Gly	Arg	Ser	Leu	Tyr	Asn	Lys	
		35					40					45			

<210> 97

<211> 26

<212> PRT

<213> Clostridium botulinum serotype D

<220>

<221> VARIANT

<222> (1)...(26)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 97

Met	Thr	Arg	Pro	Val	Lys	Asp	Asp	Pro	Val	Asn	Asp	Asn	Asp	Ile	Leu
1				5					10					15	
Tyr	Leu	Arg	Ile	Pro	Gln	Asn	Lys	Leu	Ile						
			20					25							

<210> 98

<211> 44

<212> PRT

<213> Clostridium botulinum serotype D

<220>

<221> VARIANT

<222> (1)...(44)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 98

Tyr	Thr	Ile	Arg	Asp	Gly	Phe	Asn	Leu	Thr	Asn	Lys	Gly	Phe	Asn	Ile
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 5 10 15
Glu Asn Ser Gly Gln Asn Ile Glu Arg Asn Pro Ala Leu Gln Lys Leu
20 25 30
Asp Leu Pro Pro Lys Val Cys Leu Arg Leu Thr Lys
35 40

<210> 99

<211> 31

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> VARIANT

<222> (1)...(31)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 99

Met Pro Lys Ile Asn Ser Pro Pro Asn Tyr Asn Asp Pro Val Asn Asp
1 5 10 15
Arg Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr
20 25 30

<210> 100

<211> 50

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> VARIANT

<222> (1)...(50)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 100

Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala
1 5 10 15
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val
20 25 30
Lys Lys Ala Ala Ala Cys Lys Asn Ile Val Ser Val Lys Gly Ile
35 40 45
Arg Lys
50

<210> 101

<211> 33

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> VARIANT

<222> (1)...(33)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 101

Met	Pro	Lys	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Pro	Ala	Ala	Ala	Ala
1				5					10				15		
Asn	Asp	Arg	Thr	Ile	Leu	Tyr	Ile	Lys	Pro	Gly	Gly	Cys	Gln	Glu	Phe
			20					25					30		

Tyr

<210> 102

<211> 47

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> VARIANT

<222> (1)...(47)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 102

Gly	Tyr	Asn	Ile	Asn	Asn	Leu	Lys	Val	Asn	Phe	Arg	Gly	Gln	Asn	Ala
1				5					10				15		
Asn	Leu	Asn	Pro	Arg	Ile	Ile	Thr	Pro	Ile	Thr	Gly	Arg	Gly	Leu	Val
			20					25					30		
His	Arg	Phe	Cys	Lys	Asn	Ile	Val	Ser	Val	Lys	Gly	Ile	Arg	Lys	
		35					40					45			

<210> 103

<211> 30

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> VARIANT

<222> (1)...(30)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 103

Met	Pro	Lys	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Pro	Val	Asn	Asp	Arg
1				5					10				15		
Thr	Ile	Leu	Lys	Ile	Lys	Pro	Gly	Gly	Cys	Lys	Glu	Phe	Tyr		
			20					25					30		

<210> 104

<211> 33

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> VARIANT

<222> (1)...(33)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 104

Gly	Tyr	Asn	Ile	Asn	Asn	Leu	Lys	Val	Asn	Phe	Arg	Gly	Gln	Asn	Ala
1			5					10					15		
Asn	Leu	Asn	Pro	Arg	Ile	Ile	Thr	Pro	Ile	Thr	Gly	Arg	Gly	Leu	Pro
		20					25					30			
Pro															

<210> 105

<211> 24

<212> PRT

<213> Clostridium botulinum serotype F

<220>

<221> VARIANT

<222> (1)...(24)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 105

Met	Pro	Asn	Tyr	Asn	Asp	Pro	Val	Asn	Asp	Asp	Thr	Ile	Leu	Tyr	Met
1			5					10					15		
Gln	Ile	Pro	Tyr	Glu	Glu	Lys	Ser								
		20													

<210> 106

<211> 48

<212> PRT

<213> Clostridium botulinum serotype F

<220>

<221> VARIANT

<222> (1)...(48)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 106

Thr	Val	Ser	Glu	Gly	Phe	Asn	Ile	Gly	Asn	Leu	Ala	Val	Asn	Asn	Arg
1			5					10					15		
Gly	Gln	Ser	Ile	Lys	Leu	Asn	Pro	Lys	Ile	Ile	Asp	Ser	Ile	Pro	Asp
		20					25				30				
Lys	Gly	Ala	Ala	Ala	Ala	Ala	Ala	Cys	Lys	Ser	Val	Ile	Pro	Arg	Lys
		35				40					45				

<210> 107

<211> 26

<212> PRT

<213> Clostridium botulinum serotype G

<220>

<221> VARIANT

<222> (1)...(26)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 107

Met	Pro	Val	Asn	Ile	Pro	Pro	Asp	Pro	Ile	Asn	Asn	Asp	Asp	Ile	Ile
1				5					10					15	
Met	Met	Glu	Pro	Phe	Asn	Asp	Pro	Gly	Pro						
			20					25							

<210> 108

<211> 35

<212> PRT

<213> Clostridium botulinum serotype G

<220>

<221> VARIANT

<222> (1)...(35)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 108

Gln	Asn	Glu	Gly	Phe	Asn	Ile	Ala	Ser	Lys	Asn	Leu	Lys	Thr	Glu	Phe
1				5					10					15	
Asn	Gly	Gln	Asn	Lys	Ala	Val	Asn	Lys	Glu	Ala	Tyr	Ala	Ala	Ala	Ala
			20					25					30		
Ala	Ala	Ala													
			35												

<210> 109

<211> 22

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(22)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 109

Met	Tyr	Lys	Asp	Pro	Val	Asn	Gly	Val	Asp	Ile	Ala	Tyr	Ile	Lys	Ile
1				5					10					15	
Pro	Asn	Ala	Gly	Gln	Met										
			20												

<210> 110

<211> 39

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(39)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 110

Gly	Phe	Asn	Leu	Arg	Asn	Thr	Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 5 10 15
Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr
20 25 30
Gly Leu Phe Glu Phe Tyr Lys
35

<210> 111

<211> 24

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(24)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 111

Met Pro Phe Val Asn Lys Gln Val Asn Gly Val Asp Ile Ala Tyr Ile
1 5 10 15
Lys Ile Pro Asn Ala Gly Gln Met
20

<210> 112

<211> 40

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(40)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 112

Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln
1 5 10 15
Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Leu Leu Cys
20 25 30
Val Arg Gly Ile Ile Thr Ser Lys
35 40

<210> 113

<211> 24

<212> PRT

<213> Clostridium botulinum serotype A

<220>

<221> VARIANT

<222> (1)...(24)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 113

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Ala Tyr Ile

Lys Leu Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys
 20 25 30
 Val Arg Gly Ile Ile Thr Ser Lys
 35 40

<210> 117

<211> 23

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(23)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 117

Met Pro Val Thr Ile Asn Asn Phe Asn Tyr Asn Asp Pro Ile Asp Asn
 1 5 10 15
 Asp Asn Ile Ile Met Met Glu
 20

<210> 118

<211> 45

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(45)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 118

Tyr Thr Ile Ile Ser Asp Lys Asn Met Gly Lys Glu Tyr Arg Gly Gln
 1 5 10 15
 Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu Glu Ile Ser Lys Glu His
 20 25 30
 Leu Ala Val Tyr Lys Ile Gln Met Cys Lys Ser Val Lys
 35 40 45

<210> 119

<211> 20

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(20)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 119

Met Pro Val Thr Ile Asn Asn Phe Asn Tyr Asn Asp Glu Pro Pro Phe
 1 5 10 15

Ala Arg Gly Thr
20

<210> 120

<211> 42

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(42)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 120

Tyr	Thr	Ile	Glu	Glu	Gly	Phe	Asn	Ile	Ser	Asp	Gly	Gln	Asn	Lys	Ala
1				5				10					15		
Ile	Asn	Lys	Gln	Ala	Tyr	Glu	Glu	Ile	Ser	Lys	Glu	His	Leu	Ala	Val
		20				25						30			
Tyr	Lys	Ile	Gln	Met	Cys	Lys	Ser	Val	Lys						
	35					40									

<210> 121

<211> 22

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(22)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 121

Met	Pro	Asn	Asp	Pro	Ile	Asp	Asn	Asp	Asn	Ile	Ile	Met	Met	Glu	Pro
1				5				10					15		
Pro	Phe	Ala	Arg	Gly	Thr										
		20													

<210> 122

<211> 38

<212> PRT

<213> Clostridium botulinum serotype B

<220>

<221> VARIANT

<222> (1)...(38)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 122

Tyr	Thr	Ile	Glu	Glu	Gly	Phe	Asn	Ile	Ser	Asp	Lys	Asn	Met	Gly	Lys
1				5				10					15		
Glu	Tyr	Arg	Gly	Gln	Asn	Lys	Ala	Ile	Asn	Lys	Gln	Ala	Lys	Ile	Gln
		20				25						30			

Met Cys Lys Ser Val Lys
35

<210> 123

<211> 23

<212> PRT

<213> Clostridium botulinum serotype C1

<220>

<221> VARIANT

<222> (1)...(23)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 123

Met Pro Ile Ser Asp Pro Val Asp Asn Lys Asn Ile Leu Tyr Leu Asp
1 5 10 15
Thr His Leu Asn Thr Leu Ala
20

<210> 124

<211> 40

<212> PRT

<213> Clostridium botulinum serotype C1

<220>

<221> VARIANT

<222> (1)...(40)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 124

Asn Ile Pro Lys Ser Asn Leu Asn Val Leu Phe Met Gly Gln Asn Leu
1 5 10 15
Ser Arg Asn Pro Ala Leu Arg Lys Val Lys Phe Cys His Lys Ala Ile
20 25 30
Asp Gly Arg Ser Leu Tyr Asn Lys
35 40

<210> 125

<211> 20

<212> PRT

<213> Clostridium botulinum serotype D

<220>

<221> VARIANT

<222> (1)...(20)

<223>

Variant of amino-terminal 30 amino acids of LC

<400> 125

Met Thr Trp Val Asn Asp Asn Asp Ile Leu Tyr Leu Arg Ile Pro Gln
1 5 10 15
Asn Lys Leu Ile

20

<210> 126
<211> 40
<212> PRT
<213> Clostridium botulinum serotype D

<220>
<221> VARIANT
<222> (1)...(40)
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 126
Tyr Thr Ile Arg Asp Gly Phe Asn Leu Thr Asn Lys Gly Phe Asn Ile
1 5 10 15
Glu Asn Ser Gly Gln Asn Ile Glu Arg Asn Pro Ala Asp Leu Phe Thr
20 25 30
Lys Val Cys Leu Arg Leu Thr Lys
35 40

<210> 127
<211> 22
<212> PRT
<213> Clostridium botulinum serotype E

<220>
<221> VARIANT
<222> (1)...(22)
<223> Variant of amino-terminal 30 amino acids of LC

<400> 127
Met Pro Asp Pro Val Asn Asp Arg Thr Ile Leu Tyr Ile Lys Pro Gly
1 5 10 15
Gly Cys Gln Glu Phe Tyr
20

<210> 128
<211> 40
<212> PRT
<213> Clostridium botulinum serotype E

<220>
<221> VARIANT
<222> (1)...(40)
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 128
Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala
1 5 10 15
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Arg Phe Cys Lys Asn Ile
20 25 30

Val Ser Val Lys Gly Ile Arg Lys
35 40

<210> 129

<211> 20

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> VARIANT

<222> (1)...(20)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 129

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Ile Lys Pro Gly Gly Cys
1 5 10 15
Gln Glu Phe Tyr
20

<210> 130

<211> 44

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> VARIANT

<222> (1)...(44)

<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 130

Gly Tyr Asn Ile Asn Asn Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile
1 5 10 15
Ile Thr Pro Ile Thr Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe
20 25 30
Cys Lys Asn Ile Val Ser Val Lys Gly Ile Arg Lys
35 40

<210> 131

<211> 22

<212> PRT

<213> Clostridium botulinum serotype E

<220>

<221> VARIANT

<222> (1)...(22)

<223> Variant of amino-terminal 30 amino acids of LC

<400> 131

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1 5 10 15
Thr Ile Leu Tyr Ile Lys
20

<210> 132
<211> 42
<212> PRT
<213> Clostridium botulinum serotype E

<220>
<221> VARIANT
<222> (1)...(42)
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 132
Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe Arg Gly Gln Asn Ala
1 5 10 15
Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr Gly Arg Gly Leu Val
20 25 30
Lys Lys Ile Ile Arg Lys Gly Ile Arg Lys
35 40

<210> 133
<211> 25
<212> PRT
<213> Clostridium botulinum serotype F

<220>
<221> VARIANT
<222> (1)...(25)
<223> Variant of amino-terminal 30 amino acids of LC

<400> 133
Met Pro Val Ala Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp
1 5 10 15
Asp Thr Ile Leu Tyr Met Gln Ile Pro
20 25

<210> 134
<211> 42
<212> PRT
<213> Clostridium botulinum serotype F

<220>
<221> VARIANT
<222> (1)...(42)
<223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 134
Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu Ala Val Asn Asn Arg
1 5 10 15
Gly Gln Ser Ile Lys Leu Asn Pro Lys Ile Ile Asp Ser Ile Pro Asp
20 25 30
Lys Phe Cys Lys Ser Val Ile Pro Arg Lys
35 40

<210> 135
 <211> 38
 <212> PRT
 <213> Clostridium botulinum serotype G

<220>
 <221> VARIANT
 <222> (1)...(38)
 <223> Variant of carboxyl-terminal 50 amino acids of LC

<400> 135
 Gln Asn Glu Gly Phe Asn Ile Ala Ser Lys Asn Leu Lys Thr Glu Phe
 1 5 10 15
 Asn Gly Gln Asn Lys Ala Val Asn Lys Glu Ala Arg Ile Ala Met Cys
 20 25 30
 Lys Pro Val Met Tyr Lys
 35

<210> 136
 <211> 423
 <212> PRT
 <213> Artificial Sequence

<220>
 <221> DOMAIN
 <222> (1)...(423)
 <223> BoNT/A-BoNT/E chimeric LC

<400> 136
 Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
 1 5 10 15
 Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
 20 25 30
 Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
 35 40 45
 Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
 50 55 60
 Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
 65 70 75 80
 Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
 85 90 95
 Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
 100 105 110
 Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
 115 120 125
 Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
 130 135 140
 Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp Leu Phe Glu Thr
 145 150 155 160
 Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
 165 170 175
 Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe


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      180      185      190
Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
      195      200      205
Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
      210      215      220
Lys Gly Ile Thr Thr Lys Tyr Thr Ile Thr Gln Lys Gln Asn Pro Leu
225      230      235      240
Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
      245      250      255
Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
      260      265      270
Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
      275      280      285
Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
      290      295      300
Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305      310      315      320
Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
      325      330      335
Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
      340      345      350
Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
      355      360      365
Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
      370      375      380
Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385      390      395      400
Gly Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val
      405      410      415
Arg Gly Ile Ile Thr Ser Lys
      420

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<210> 137

<211> 441

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1)...(441)

<223> BoNT/A-BoNT/B chimeric LC

<400> 137

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Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly
  1          5          10          15
Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met Gly Arg
      20      25      30
Tyr Tyr Lys Ala Phe Lys Ile Thr Asp Arg Ile Trp Ile Ile Pro Glu
      35      40      45
Arg Tyr Thr Phe Gly Tyr Lys Pro Glu Asp Phe Asn Lys Ser Ser Gly
      50      55      60
Ile Phe Asn Arg Asp Val Cys Glu Tyr Tyr Asp Pro Asp Tyr Leu Asn
65      70      75      80
Thr Asn Asp Lys Lys Asn Ile Phe Phe Gln Thr Leu Ile Lys Leu Phe

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<210> 138
<211> 423
<212> PRT
<213> Artificial Sequence
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<223> BoNT/A-BoNT/E chimeric LC

<400> 138

Met	Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Asn	Asp	Pro	Val	Asn	Asp	Arg
1				5					10					15	
Thr	Ile	Leu	Tyr	Ile	Lys	Pro	Gly	Gly	Cys	Gln	Glu	Phe	Tyr	Lys	Ser
			20					25					30		
Phe	Asn	Ile	Met	Lys	Asn	Ile	Trp	Ile	Ile	Pro	Glu	Arg	Asn	Val	Ile
		35					40					45			
Gly	Thr	Thr	Pro	Gln	Asp	Phe	His	Pro	Pro	Thr	Ser	Leu	Lys	Asn	Gly
	50					55					60				
Asp	Ser	Ser	Tyr	Tyr	Asp	Pro	Asn	Tyr	Leu	Gln	Ser	Asp	Glu	Glu	Lys
65					70					75					80
Asp	Arg	Phe	Leu	Lys	Ile	Val	Thr	Lys	Ile	Phe	Asn	Arg	Ile	Asn	Asn
			85						90					95	
Asn	Leu	Ser	Gly	Gly	Ile	Leu	Leu	Glu	Glu	Leu	Ser	Lys	Ala	Asn	Pro
			100					105					110		
Tyr	Leu	Gly	Asn	Asp	Asn	Thr	Pro	Asp	Asn	Gln	Phe	His	Ile	Gly	Asp
		115					120					125			
Ala	Ser	Ala	Val	Glu	Ile	Lys	Phe	Ser	Asn	Gly	Ser	Gln	Asp	Ile	Leu
	130					135					140				
Leu	Pro	Asn	Val	Ile	Ile	Met	Gly	Ala	Glu	Pro	Asp	Leu	Phe	Glu	Thr
145					150					155					160
Asn	Ser	Ser	Asn	Ile	Ser	Leu	Arg	Asn	Asn	Tyr	Met	Pro	Ser	Asn	His
			165						170					175	
Gly	Phe	Gly	Ser	Ile	Ala	Ile	Val	Thr	Phe	Ser	Pro	Glu	Tyr	Ser	Phe
			180					185					190		
Arg	Phe	Asn	Asp	Asn	Ser	Met	Asn	Glu	Phe	Ile	Gln	Asp	Pro	Ala	Leu
		195					200					205			
Thr	Leu	Met	His	Glu	Leu	Ile	His	Ser	Leu	His	Gly	Leu	Tyr	Gly	Ala
	210					215					220				
Lys	Gly	Ile	Thr	Thr	Lys	Tyr	Thr	Ile	Thr	Gln	Lys	Gln	Asn	Pro	Leu
225					230					235					240
Ile	Thr	Asn	Ile	Arg	Gly	Thr	Asn	Ile	Glu	Glu	Phe	Leu	Thr	Phe	Gly
			245						250					255	
Gly	Thr	Asp	Leu	Asn	Ile	Ile	Thr	Ser	Ala	Gln	Ser	Asn	Asp	Ile	Tyr
			260					265					270		
Thr	Asn	Leu	Leu	Ala	Asp	Tyr	Lys	Lys	Ile	Ala	Ser	Lys	Leu	Ser	Lys
		275					280					285			
Val	Gln	Val	Ser	Asn	Pro	Leu	Leu	Asn	Pro	Tyr	Lys	Asp	Val	Phe	Glu
	290					295					300				
Ala	Lys	Tyr	Gly	Leu	Asp	Lys	Asp	Ala	Ser	Gly	Ile	Tyr	Ser	Val	Asn
305					310					315					320
Ile	Asn	Lys	Phe	Asn	Asp	Ile	Phe	Lys	Lys	Leu	Tyr	Ser	Phe	Thr	Glu
			325						330					335	
Phe	Asp	Leu	Ala	Thr	Lys	Phe	Gln	Val	Lys	Cys	Arg	Gln	Thr	Tyr	Ile
			340				345						350		
Gly	Gln	Tyr	Lys	Tyr	Phe	Lys	Leu	Ser	Asn	Leu	Leu	Asn	Asp	Ser	Ile
		355					360					365			
Tyr	Asn	Ile	Ser	Glu	Gly	Tyr	Asn	Ile	Asn	Asn	Leu	Lys	Val	Asn	Phe
	370					375					380				
Arg	Gly	Gln	Asn	Ala	Asn	Leu	Asn	Pro	Arg	Ile	Ile	Thr	Pro	Ile	Thr
385					390					395					400
Gly	Lys	Asn	Phe	Thr	Gly	Leu	Phe	Glu	Phe	Tyr	Lys	Leu	Leu	Cys	Val
			405						410					415	

Arg Gly Ile Ile Thr Ser Lys
420

<210> 139

<211> 441

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1)...(441)

<223> BoNT/A-BoNT/B chimeric LC

<400> 139

Met	Pro	Phe	Val	Asn	Lys	Gln	Phe	Asn	Tyr	Asn	Asp	Pro	Ile	Asp	Asn	1	5	10	15
Asp	Asn	Ile	Ile	Met	Met	Glu	Pro	Pro	Phe	Ala	Arg	Gly	Thr	Gly	Arg	20	25	30	
Tyr	Tyr	Lys	Ala	Phe	Lys	Ile	Thr	Asp	Arg	Ile	Trp	Ile	Ile	Pro	Glu	35	40	45	
Arg	Tyr	Thr	Phe	Gly	Tyr	Lys	Pro	Glu	Asp	Phe	Asn	Lys	Ser	Ser	Gly	50	55	60	
Ile	Phe	Asn	Arg	Asp	Val	Cys	Glu	Tyr	Tyr	Asp	Pro	Asp	Tyr	Leu	Asn	65	70	75	80
Thr	Asn	Asp	Lys	Lys	Asn	Ile	Phe	Phe	Gln	Thr	Leu	Ile	Lys	Leu	Phe	85	90	95	
Asn	Arg	Ile	Lys	Ser	Lys	Pro	Leu	Gly	Glu	Lys	Leu	Leu	Glu	Met	Ile	100	105	110	
Ile	Asn	Gly	Ile	Pro	Tyr	Leu	Gly	Asp	Arg	Arg	Val	Pro	Leu	Glu	Glu	115	120	125	
Phe	Asn	Thr	Asn	Ile	Ala	Ser	Val	Thr	Val	Asn	Lys	Leu	Ile	Ser	Asn	130	135	140	
Pro	Gly	Glu	Val	Glu	Arg	Lys	Lys	Gly	Ile	Phe	Ala	Asn	Leu	Ile	Ile	145	150	155	160
Phe	Gly	Pro	Gly	Pro	Val	Leu	Asn	Glu	Asn	Glu	Thr	Ile	Asp	Ile	Gly	165	170	175	
Ile	Gln	Asn	His	Phe	Ala	Ser	Arg	Glu	Gly	Phe	Gly	Gly	Ile	Met	Gln	180	185	190	
Met	Lys	Phe	Cys	Pro	Glu	Tyr	Val	Ser	Val	Phe	Asn	Asn	Val	Gln	Glu	195	200	205	
Asn	Lys	Gly	Ala	Ser	Ile	Phe	Asn	Arg	Arg	Gly	Tyr	Phe	Ser	Asp	Pro	210	215	220	
Ala	Leu	Ile	Leu	Met	His	Glu	Leu	Ile	His	Val	Leu	His	Gly	Leu	Tyr	225	230	235	240
Gly	Ile	Lys	Val	Asp	Asp	Leu	Pro	Ile	Val	Pro	Asn	Glu	Lys	Lys	Phe	245	250	255	
Phe	Met	Gln	Ser	Thr	Asp	Thr	Ile	Gln	Ala	Glu	Glu	Leu	Tyr	Thr	Phe	260	265	270	
Gly	Gly	Gln	Asp	Pro	Ser	Ile	Ile	Ser	Pro	Ser	Thr	Asp	Lys	Ser	Ile	275	280	285	
Tyr	Asp	Lys	Val	Leu	Gln	Asn	Phe	Arg	Gly	Ile	Val	Asp	Arg	Leu	Asn	290	295	300	
Lys	Val	Leu	Val	Cys	Ile	Ser	Asp	Pro	Asn	Ile	Asn	Ile	Asn	Ile	Tyr	305	310	315	320

Lys Asn Lys Phe Lys Asp Lys Tyr Lys Phe Val Glu Asp Ser Glu Gly
 325 330 335
 Lys Tyr Ser Ile Asp Val Glu Ser Phe Asn Lys Leu Tyr Lys Ser Leu
 340 345 350
 Met Leu Gly Phe Thr Glu Ile Asn Ile Ala Glu Asn Tyr Lys Ile Lys
 355 360 365
 Thr Arg Ala Ser Tyr Phe Ser Asp Ser Leu Pro Pro Val Lys Ile Lys
 370 375 380
 Asn Leu Leu Asp Asn Glu Ile Tyr Thr Ile Glu Glu Gly Phe Asn Ile
 385 390 395 400
 Ser Asp Lys Asn Met Gly Lys Glu Tyr Arg Gly Gln Asn Lys Ala Ile
 405 410 415
 Asn Lys Gln Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu
 420 425 430
 Cys Val Arg Gly Ile Ile Thr Ser Lys
 435 440

<210> 140

<211> 436

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1)...(436)

<223> BoNT/A-BoNT/F chimeric LC

<400> 140

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Asn Asp Pro Val Asn Asp
 1 5 10 15
 Asp Thr Ile Leu Tyr Met Gln Ile Pro Tyr Glu Glu Lys Ser Lys Lys
 20 25 30
 Tyr Tyr Lys Ala Phe Glu Ile Met Arg Asn Val Trp Ile Ile Pro Glu
 35 40 45
 Arg Asn Thr Ile Gly Thr Asn Pro Ser Asp Phe Asp Pro Pro Ala Ser
 50 55 60
 Leu Lys Asn Gly Ser Ser Ala Tyr Tyr Asp Pro Asn Tyr Leu Thr Thr
 65 70 75 80
 Asp Ala Glu Lys Asp Arg Tyr Leu Lys Thr Thr Ile Lys Leu Phe Lys
 85 90 95
 Arg Ile Asn Ser Asn Pro Ala Gly Lys Val Leu Leu Gln Glu Ile Ser
 100 105 110
 Tyr Ala Lys Pro Tyr Leu Gly Asn Asp His Thr Pro Ile Asp Glu Phe
 115 120 125
 Ser Pro Val Thr Arg Thr Thr Ser Val Asn Ile Lys Leu Ser Thr Asn
 130 135 140
 Val Glu Ser Ser Met Leu Leu Asn Leu Leu Val Leu Gly Ala Gly Pro
 145 150 155 160
 Asp Ile Phe Glu Ser Cys Cys Tyr Pro Val Arg Lys Leu Ile Asp Pro
 165 170 175
 Asp Val Val Tyr Asp Pro Ser Asn Tyr Gly Phe Gly Ser Ile Asn Ile
 180 185 190
 Val Thr Phe Ser Pro Glu Tyr Glu Tyr Thr Phe Asn Asp Ile Ser Gly
 195 200 205

Gly His Asn Ser Ser Thr Glu Ser Phe Ile Ala Asp Pro Ala Ile Ser
 210 215 220
 Leu Ala His Glu Leu Ile His Ala Leu His Gly Leu Tyr Gly Ala Arg
 225 230 235 240
 Gly Val Thr Tyr Glu Thr Ile Glu Val Lys Gln Ala Pro Leu Met
 245 250 255
 Ile Ala Glu Lys Pro Ile Arg Leu Glu Phe Leu Thr Phe Gly Gly
 260 265 270
 Gln Asp Leu Asn Ile Ile Thr Ser Ala Met Lys Glu Lys Ile Tyr Asn
 275 280 285
 Asn Leu Leu Ala Asn Tyr Glu Lys Ile Ala Thr Arg Leu Ser Glu Val
 290 295 300
 Asn Ser Ala Pro Pro Glu Tyr Asp Ile Asn Glu Tyr Lys Asp Tyr Phe
 305 310 315 320
 Gln Trp Lys Tyr Gly Leu Asp Lys Asn Ala Asp Gly Ser Tyr Thr Val
 325 330 335
 Asn Glu Asn Lys Phe Asn Glu Ile Tyr Lys Lys Leu Tyr Ser Phe Thr
 340 345 350
 Glu Ser Asp Leu Ala Asn Lys Phe Lys Val Lys Cys Arg Asn Thr Tyr
 355 360 365
 Phe Ile Lys Tyr Glu Phe Leu Lys Val Pro Asn Leu Leu Asp Asp Asp
 370 375 380
 Ile Tyr Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu Ala Val Asn
 385 390 395 400
 Asn Arg Gly Gln Ser Ile Lys Leu Asn Pro Lys Ile Ile Asp Lys Asn
 405 410 415
 Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile
 420 425 430
 Ile Thr Ser Lys
 435

<210> 141

<211> 483

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1)...(483)

<223> BoNT/A-BoNT/B chimeric LC

<400> 141

Met Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly
 1 5 10 15
 Val Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met Gln Pro
 20 25 30
 Val Lys Ala Phe Lys Ile His Asn Lys Ile Trp Val Ile Pro Glu Arg
 35 40 45
 Asp Thr Phe Tyr Asn Asp Pro Ile Asp Asn Asp Asn Ile Ile Met Met
 50 55 60
 Glu Pro Pro Phe Ala Arg Gly Thr Gly Arg Tyr Tyr Lys Ala Phe Lys
 65 70 75 80
 Ile Thr Asp Arg Ile Trp Ile Ile Pro Glu Arg Tyr Thr Phe Gly Tyr
 85 90 95

Lys Pro Glu Asp Phe Asn Lys Ser Ser Gly Ile Phe Asn Arg Asp Val
 100 105 110
 Cys Glu Tyr Tyr Asp Pro Asp Tyr Leu Asn Thr Asn Asp Lys Lys Asn
 115 120 125
 Ile Phe Phe Gln Thr Leu Ile Lys Leu Phe Asn Arg Ile Lys Ser Lys
 130 135 140
 Pro Leu Gly Glu Lys Leu Leu Glu Met Ile Ile Asn Gly Ile Pro Tyr
 145 150 155 160
 Leu Gly Asp Arg Arg Val Pro Leu Glu Glu Phe Asn Thr Asn Ile Ala
 165 170 175
 Ser Val Thr Val Asn Lys Leu Ile Ser Asn Pro Gly Glu Val Glu Arg
 180 185 190
 Lys Lys Gly Ile Phe Ala Asn Leu Ile Ile Phe Gly Pro Gly Pro Val
 195 200 205
 Leu Asn Glu Asn Glu Thr Ile Asp Ile Gly Ile Gln Asn His Phe Ala
 210 215 220
 Ser Arg Glu Gly Phe Gly Gly Ile Met Gln Met Lys Phe Cys Pro Glu
 225 230 235 240
 Tyr Val Ser Val Phe Asn Asn Val Gln Glu Asn Lys Gly Ala Ser Ile
 245 250 255
 Phe Asn Arg Arg Gly Tyr Phe Ser Asp Pro Ala Leu Ile Leu Met His
 260 265 270
 Glu Leu Ile His Val Leu His Gly Leu Tyr Gly Ile Lys Val Asp Asp
 275 280 285
 Leu Pro Ile Val Pro Asn Glu Lys Lys Phe Phe Met Gln Ser Thr Asp
 290 295 300
 Thr Ile Gln Ala Glu Glu Leu Tyr Thr Phe Gly Gly Gln Asp Pro Ser
 305 310 315 320
 Ile Ile Ser Pro Ser Thr Asp Lys Ser Ile Tyr Asp Lys Val Leu Gln
 325 330 335
 Asn Phe Arg Gly Ile Val Asp Arg Leu Asn Lys Val Leu Val Cys Ile
 340 345 350
 Ser Asp Pro Asn Ile Asn Ile Asn Ile Tyr Lys Asn Lys Phe Lys Asp
 355 360 365
 Lys Tyr Lys Phe Val Glu Asp Ser Glu Gly Lys Tyr Ser Ile Asp Val
 370 375 380
 Glu Ser Phe Asn Lys Leu Tyr Lys Ser Leu Met Leu Gly Phe Thr Glu
 385 390 395 400
 Ile Asn Ile Ala Glu Asn Tyr Lys Ile Lys Thr Arg Ala Ser Tyr Phe
 405 410 415
 Ser Asp Ser Leu Pro Pro Val Lys Ile Lys Asn Leu Leu Asp Asn Glu
 420 425 430
 Ile Tyr Thr Ile Glu Glu Gly Phe Asn Ile Ser Asp Lys Asn Met Gly
 435 440 445
 Lys Glu Tyr Arg Gly Gln Asn Lys Ala Ile Asn Lys Gln Ala Tyr Glu
 450 455 460
 Glu Ile Ser Lys Glu His Leu Ala Val Tyr Lys Ile Gln Met Cys Lys
 465 470 475 480
 Ser Val Lys

<210> 142

<211> 458

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1)...(458)

<223> BoNT/A-BoNT/E chimeric LC

<400> 142

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Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
 1           5           10           15
Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
      20           25           30
Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
      35           40           45
Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
      50           55           60
Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
      65           70           75           80
Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
      85           90           95
Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
      100          105          110
Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
      115          120          125
Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
      130          135          140
Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp Leu Phe Glu Thr
      145          150          155          160
Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
      165          170          175
Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
      180          185          190
Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
      195          200          205
Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
      210          215          220
Lys Gly Ile Thr Thr Lys Tyr Thr Ile Thr Gln Lys Gln Asn Pro Leu
      225          230          235          240
Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
      245          250          255
Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
      260          265          270
Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
      275          280          285
Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
      290          295          300
Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
      305          310          315          320
Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
      325          330          335
Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
      340          345          350
Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
      355          360          365
Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe

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      370      375      380
Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Gly Phe
385      390      395      400
Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln Asn Thr
      405      410      415
Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr Gly Leu
      420      425      430
Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr Ser Lys
      435      440      445
Asn Ile Val Ser Val Lys Gly Ile Arg Lys
      450      455

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<210> 143

<211> 443

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1)...(443)

<223> BoNT/A-BoNT/E chimeric LC

<400> 143

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Met Pro Lys Ile Asn Ser Phe Asn Tyr Met Pro Phe Val Asn Lys Gln
1      5      10      15
Phe Asn Tyr Lys Asp Pro Val Asn Gly Val Asp Ile Ala Tyr Ile Lys
      20      25      30
Ile Pro Asn Ala Gly Gln Met Tyr Ile Lys Pro Gly Gly Cys Gln Glu
      35      40      45
Phe Tyr Lys Ser Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu
      50      55      60
Arg Asn Val Ile Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser
      65      70      75      80
Leu Lys Asn Gly Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser
      85      90      95
Asp Glu Glu Lys Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn
      100     105     110
Arg Ile Asn Asn Asn Leu Ser Gly Gly Ile Leu Leu Glu Leu Ser
      115     120     125
Lys Ala Asn Pro Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe
      130     135     140
His Ile Gly Asp Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser
      145     150     155     160
Gln Asp Ile Leu Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp
      165     170     175
Leu Phe Glu Thr Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met
      180     185     190
Pro Ser Asn His Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro
      195     200     205
Glu Tyr Ser Phe Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln
      210     215     220
Asp Pro Ala Leu Thr Leu Met His Glu Leu Ile His Ser Leu His Gly
      225     230     235     240
Leu Tyr Gly Ala Lys Gly Ile Thr Thr Lys Tyr Thr Ile Thr Gln Lys

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				245					250					255			
Gln	Asn	Pro	Leu	Ile	Thr	Asn	Ile	Arg	Gly	Thr	Asn	Ile	Glu	Glu	Phe		
			260					265					270				
Leu	Thr	Phe	Gly	Gly	Thr	Asp	Leu	Asn	Ile	Ile	Thr	Ser	Ala	Gln	Ser		
		275					280					285					
Asn	Asp	Ile	Tyr	Thr	Asn	Leu	Ala	Asp	Tyr	Lys	Lys	Ile	Ala	Ser			
	290					295				300							
Lys	Leu	Ser	Lys	Val	Gln	Val	Ser	Asn	Pro	Leu	Leu	Asn	Pro	Tyr	Lys		
305					310					315				320			
Asp	Val	Phe	Glu	Ala	Lys	Tyr	Gly	Leu	Asp	Lys	Asp	Ala	Ser	Gly	Ile		
			325					330						335			
Tyr	Ser	Val	Asn	Ile	Asn	Lys	Phe	Asn	Asp	Ile	Phe	Lys	Lys	Leu	Tyr		
		340						345					350				
Ser	Phe	Thr	Glu	Phe	Asp	Leu	Ala	Thr	Lys	Phe	Gln	Val	Lys	Cys	Arg		
	355					360					365						
Gln	Thr	Tyr	Ile	Gly	Gln	Tyr	Lys	Tyr	Phe	Lys	Leu	Ser	Asn	Leu	Leu		
	370					375					380						
Asn	Asp	Ser	Ile	Tyr	Asn	Ile	Ser	Glu	Gly	Phe	Asn	Leu	Arg	Asn	Thr		
385					390					395				400			
Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln	Asn	Thr	Glu	Ile	Asn	Asn	Met		
		405						410					415				
Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr	Gly	Leu	Phe	Glu	Phe	Tyr	Lys		
	420							425				430					
Leu	Leu	Cys	Val	Arg	Gly	Ile	Ile	Thr	Ser	Lys							
	435					440											

<210> 144

<211> 461

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1)...(461)

<223> BoNT/A-BoNT/B chimeric LC

<400> 144

Met	Pro	Val	Thr	Ile	Asn	Asn	Phe	Asn	Met	Pro	Phe	Val	Asn	Lys	Gln		
1				5				10					15				
Phe	Asn	Tyr	Lys	Asp	Pro	Val	Asn	Gly	Val	Asp	Ile	Ala	Tyr	Ile	Lys		
		20					25					30					
Ile	Pro	Asn	Ala	Gly	Gln	Met	Ile	Met	Met	Glu	Pro	Pro	Phe	Ala	Arg		
	35					40					45						
Gly	Thr	Gly	Arg	Tyr	Tyr	Lys	Ala	Phe	Lys	Ile	Thr	Asp	Arg	Ile	Trp		
	50					55				60							
Ile	Ile	Pro	Glu	Arg	Tyr	Thr	Phe	Gly	Tyr	Lys	Pro	Glu	Asp	Phe	Asn		
65				70					75					80			
Lys	Ser	Ser	Gly	Ile	Phe	Asn	Arg	Asp	Val	Cys	Glu	Tyr	Tyr	Asp	Pro		
		85					90					95					
Asp	Tyr	Leu	Asn	Thr	Asn	Asp	Lys	Lys	Asn	Ile	Phe	Phe	Gln	Thr	Leu		
		100				105						110					
Ile	Lys	Leu	Phe	Asn	Arg	Ile	Lys	Ser	Lys	Pro	Leu	Gly	Glu	Lys	Leu		
	115					120					125						
Leu	Glu	Met	Ile	Ile	Asn	Gly	Ile	Pro	Tyr	Leu	Gly	Asp	Arg	Arg	Val		

130	135	140															
Pro	Leu	Glu	Glu	Phe	Asn	Thr	Asn	Ile	Ala	Ser	Val	Thr	Val	Asn	Lys		
145					150					155					160		
Leu	Ile	Ser	Asn	Pro	Gly	Glu	Val	Glu	Arg	Lys	Lys	Gly	Ile	Phe	Ala		
				165					170						175		
Asn	Leu	Ile	Ile	Phe	Gly	Pro	Gly	Pro	Val	Leu	Asn	Glu	Asn	Glu	Thr		
			180					185					190				
Ile	Asp	Ile	Gly	Ile	Gln	Asn	His	Phe	Ala	Ser	Arg	Glu	Gly	Phe	Gly		
	195					200					205						
Gly	Ile	Met	Gln	Met	Lys	Phe	Cys	Pro	Glu	Tyr	Val	Ser	Val	Phe	Asn		
	210					215					220						
Asn	Val	Gln	Glu	Asn	Lys	Gly	Ala	Ser	Ile	Phe	Asn	Arg	Arg	Gly	Tyr		
225				230					235						240		
Phe	Ser	Asp	Pro	Ala	Leu	Ile	Leu	Met	His	Glu	Leu	Ile	His	Val	Leu		
				245					250						255		
His	Gly	Leu	Tyr	Gly	Ile	Lys	Val	Asp	Asp	Leu	Pro	Ile	Val	Pro	Asn		
			260					265						270			
Glu	Lys	Lys	Phe	Phe	Met	Gln	Ser	Thr	Asp	Thr	Ile	Gln	Ala	Glu	Glu		
	275						280					285					
Leu	Tyr	Thr	Phe	Gly	Gly	Gln	Asp	Pro	Ser	Ile	Ile	Ser	Pro	Ser	Thr		
	290					295					300						
Asp	Lys	Ser	Ile	Tyr	Asp	Lys	Val	Leu	Gln	Asn	Phe	Arg	Gly	Ile	Val		
305					310					315					320		
Asp	Arg	Leu	Asn	Lys	Val	Leu	Val	Cys	Ile	Ser	Asp	Pro	Asn	Ile	Asn		
				325					330						335		
Ile	Asn	Ile	Tyr	Lys	Asn	Lys	Phe	Lys	Asp	Lys	Tyr	Lys	Phe	Val	Glu		
	340							345					350				
Asp	Ser	Glu	Gly	Lys	Tyr	Ser	Ile	Asp	Val	Glu	Ser	Phe	Asn	Lys	Leu		
	355						360					365					
Tyr	Lys	Ser	Leu	Met	Leu	Gly	Phe	Thr	Glu	Ile	Asn	Ile	Ala	Glu	Asn		
	370					375					380						
Tyr	Lys	Ile	Lys	Thr	Arg	Ala	Ser	Tyr	Phe	Ser	Asp	Ser	Leu	Pro	Pro		
385					390					395					400		
Val	Lys	Ile	Lys	Asn	Leu	Leu	Asp	Asn	Glu	Ile	Gly	Phe	Asn	Leu	Arg		
				405					410						415		
Asn	Thr	Asn	Leu	Ala	Ala	Asn	Phe	Asn	Gly	Gln	Asn	Thr	Glu	Ile	Asn		
			420				425						430				
Asn	Met	Asn	Phe	Thr	Lys	Leu	Lys	Asn	Phe	Thr	Gly	Leu	Phe	Glu	Phe		
	435						440					445					
Tyr	Lys	Leu	Leu	Cys	Val	Arg	Gly	Ile	Ile	Thr	Ser	Lys					
	450					455				460							

<210> 145

<211> 456

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1) ... (456)

<223> BoNT/A-BoNT/F chimeric LC

<400> 145

Met Pro Val Ala Ile Asn Ser Phe Asn Met Pro Phe Val Asn Lys Gln

1		5		10		15
Phe	Asn	Tyr	Lys	Asp	Pro	Val
			20			
Ile	Pro	Asn	Ala	Gly	Gln	Met
		35			40	
Lys	Ser	Lys	Lys	Tyr	Tyr	Lys
	50				55	
Ile	Ile	Pro	Glu	Arg	Asn	Thr
65					70	
Pro	Pro	Ala	Ser	Leu	Lys	Asn
				85		
Tyr	Leu	Thr	Thr	Asp	Ala	Glu
			100			
Lys	Leu	Phe	Lys	Arg	Ile	Asn
		115				120
Gln	Glu	Ile	Ser	Tyr	Ala	Lys
						135
Ile	Asp	Glu	Phe	Ser	Pro	Val
145					150	
Leu	Ser	Thr	Asn	Val	Glu	Ser
				165		
Gly	Ala	Gly	Pro	Asp	Ile	Phe
			180			
Leu	Ile	Asp	Pro	Asp	Val	Val
		195				200
Ser	Ile	Asn	Ile	Val	Thr	Phe
	210					215
Asp	Ile	Ser	Gly	Gly	His	Asn
225					230	
Pro	Ala	Ile	Ser	Leu	Ala	His
				245		
Tyr	Gly	Ala	Arg	Gly	Val	Thr
			260			
Ala	Pro	Leu	Met	Ile	Ala	Glu
			275			
Thr	Phe	Gly	Gly	Gln	Asp	Leu
	290				295	
Lys	Ile	Tyr	Asn	Asn	Leu	Leu
305					310	
Leu	Ser	Glu	Val	Asn	Ser	Ala
				325		
Lys	Asp	Tyr	Phe	Gln	Trp	Lys
			340			
Ser	Tyr	Thr	Val	Asn	Glu	Asn
		355				360
Tyr	Ser	Phe	Thr	Glu	Ser	Asp
	370				375	
Arg	Asn	Thr	Tyr	Phe	Ile	Lys
385					390	
Leu	Asp	Asp	Asp	Ile	Tyr	Gly
				405		
Ala	Asn	Phe	Asn	Gly	Gln	Asn
				420		
Lys	Leu	Lys	Asn	Phe	Thr	Gly
		435				440

Val Arg Gly Ile Ile Thr Ser Lys
450 455

<210> 146

<211> 449

<212> PRT

<213> Artificial Sequence

<220>

<221> DOMAIN

<222> (1)...(449)

<223> BoNT/A-BoNT/E chimeric LC

<400> 146

Met	Pro	Lys	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Pro	Val	Thr	Ile	Asn
1				5				10						15	
Asn	Phe	Asn	Tyr	Asp	Arg	Thr	Ile	Leu	Tyr	Ile	Lys	Pro	Gly	Gly	Cys
		20						25					30		
Gln	Glu	Phe	Tyr	Lys	Ser	Phe	Asn	Ile	Met	Lys	Asn	Ile	Trp	Ile	Ile
		35					40					45			
Pro	Glu	Arg	Asn	Val	Ile	Gly	Thr	Thr	Pro	Gln	Asp	Phe	His	Pro	Pro
	50					55					60				
Thr	Ser	Leu	Lys	Asn	Gly	Asp	Ser	Ser	Tyr	Tyr	Asp	Pro	Asn	Tyr	Leu
65				70						75					80
Gln	Ser	Asp	Glu	Glu	Lys	Asp	Arg	Phe	Leu	Lys	Ile	Val	Thr	Lys	Ile
			85						90					95	
Phe	Asn	Arg	Ile	Asn	Asn	Asn	Leu	Ser	Gly	Gly	Ile	Leu	Leu	Glu	Glu
			100					105					110		
Leu	Ser	Lys	Ala	Asn	Pro	Tyr	Leu	Gly	Asn	Asp	Asn	Thr	Pro	Asp	Asn
		115					120					125			
Gln	Phe	His	Ile	Gly	Asp	Ala	Ser	Ala	Val	Glu	Ile	Lys	Phe	Ser	Asn
		130				135						140			
Gly	Ser	Gln	Asp	Ile	Leu	Leu	Pro	Asn	Val	Ile	Ile	Met	Gly	Ala	Glu
145					150					155					160
Pro	Asp	Leu	Phe	Glu	Thr	Asn	Ser	Ser	Asn	Ile	Ser	Leu	Arg	Asn	Asn
				165					170					175	
Tyr	Met	Pro	Ser	Asn	His	Gly	Phe	Gly	Ser	Ile	Ala	Ile	Val	Thr	Phe
		180						185					190		
Ser	Pro	Glu	Tyr	Ser	Phe	Arg	Phe	Asn	Asp	Asn	Ser	Met	Asn	Glu	Phe
		195					200					205			
Ile	Gln	Asp	Pro	Ala	Leu	Thr	Leu	Met	His	Glu	Leu	Ile	His	Ser	Leu
		210				215					220				
His	Gly	Leu	Tyr	Gly	Ala	Lys	Gly	Ile	Thr	Thr	Lys	Tyr	Thr	Ile	Thr
225					230					235					240
Gln	Lys	Gln	Asn	Pro	Leu	Ile	Thr	Asn	Ile	Arg	Gly	Thr	Asn	Ile	Glu
			245						250					255	
Glu	Phe	Leu	Thr	Phe	Gly	Gly	Thr	Asp	Leu	Asn	Ile	Ile	Thr	Ser	Ala
			260				265						270		
Gln	Ser	Asn	Asp	Ile	Tyr	Thr	Asn	Leu	Leu	Ala	Asp	Tyr	Lys	Lys	Ile
		275					280					285			
Ala	Ser	Lys	Leu	Ser	Lys	Val	Gln	Val	Ser	Asn	Pro	Leu	Leu	Asn	Pro
		290				295					300				
Tyr	Lys	Asp	Val	Phe	Glu	Ala	Lys	Tyr	Gly	Leu	Asp	Lys	Asp	Ala	Ser
305					310					315					320

[illegible]

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<210> 147
<211> 459
<212> PRT
<213> Artificial Sequence
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<220>
<221> DOMAIN
<222> (1)...(459)
<223> BoNT/A-BoNT/B-BoNT/F chimeric LC
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<400> 147															
Met	Pro	Val	Ala	Ile	Asn	Ser	Phe	Asn	Tyr	Asn	Asp	Val	Thr	Ile	Asn
1				5					10					15	
Asn	Phe	Asn	Tyr	Thr	Ile	Leu	Tyr	Met	Gln	Ile	Pro	Tyr	Glu	Glu	Lys
			20					25					30		
Ser	Lys	Lys	Tyr	Tyr	Lys	Ala	Phe	Glu	Ile	Met	Arg	Asn	Val	Trp	Ile
		35					40					45			
Ile	Pro	Glu	Arg	Asn	Thr	Ile	Gly	Thr	Asn	Pro	Ser	Asp	Phe	Asp	Pro
	50					55					60				
Pro	Ala	Ser	Leu	Lys	Asn	Gly	Ser	Ser	Ala	Tyr	Tyr	Asp	Pro	Asn	Tyr
65					70					75					80
Leu	Thr	Thr	Asp	Ala	Glu	Lys	Asp	Arg	Tyr	Leu	Lys	Thr	Thr	Ile	Lys
				85					90					95	
Leu	Phe	Lys	Arg	Ile	Asn	Ser	Asn	Pro	Ala	Gly	Lys	Val	Leu	Leu	Gln
			100					105					110		
Glu	Ile	Ser	Tyr	Ala	Lys	Pro	Tyr	Leu	Gly	Asn	Asp	His	Thr	Pro	Ile
		115					120					125			
Asp	Glu	Phe	Ser	Pro	Val	Thr	Arg	Thr	Thr	Ser	Val	Asn	Ile	Lys	Leu
	130					135					140				
Ser	Thr	Asn	Val	Glu	Ser	Ser	Met	Leu	Leu	Asn	Leu	Leu	Val	Leu	Gly
145					150					155					160
Ala	Gly	Pro	Asp	Ile	Phe	Glu	Ser	Cys	Cys	Tyr	Pro	Val	Arg	Lys	Leu
				165					170					175	
Ile	Asp	Pro	Asp	Val	Val	Tyr	Asp	Pro	Ser	Asn	Tyr	Gly	Phe	Gly	Ser
			180					185					190		

Ile Asn Ile Val Thr Phe Ser Pro Glu Tyr Glu Tyr Thr Phe Asn Asp
 195 200 205
 Ile Ser Gly Gly His Asn Ser Ser Thr Glu Ser Phe Ile Ala Asp Pro
 210 215 220
 Ala Ile Ser Leu Ala His Glu Leu Ile His Ala Leu His Gly Leu Tyr
 225 230 235 240
 Gly Ala Arg Gly Val Thr Tyr Glu Glu Thr Ile Glu Val Lys Gln Ala
 245 250 255
 Pro Leu Met Ile Ala Glu Lys Pro Ile Arg Leu Glu Glu Phe Leu Thr
 260 265 270
 Phe Gly Gly Gln Asp Leu Asn Ile Ile Thr Ser Ala Met Lys Glu Lys
 275 280 285
 Ile Tyr Asn Asn Leu Leu Ala Asn Tyr Glu Lys Ile Ala Thr Arg Leu
 290 295 300
 Ser Glu Val Asn Ser Ala Pro Pro Glu Tyr Asp Ile Asn Glu Tyr Lys
 305 310 315 320
 Asp Tyr Phe Gln Trp Lys Tyr Gly Leu Asp Lys Asn Ala Asp Gly Ser
 325 330 335
 Tyr Thr Val Asn Glu Asn Lys Phe Asn Glu Ile Tyr Lys Lys Leu Tyr
 340 345 350
 Ser Phe Thr Glu Ser Asp Leu Ala Asn Lys Phe Lys Val Lys Cys Arg
 355 360 365
 Asn Thr Tyr Phe Ile Lys Tyr Glu Phe Leu Lys Val Pro Asn Leu Leu
 370 375 380
 Asp Asp Asp Ile Tyr Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu
 385 390 395 400
 Ala Val Asn Asn Arg Gly Gln Ser Ile Lys Leu Asn Pro Lys Ile Ile
 405 410 415
 Asp Ser Ile Pro Asp Lys Gly Leu Val Glu Lys Asn Asn Met Asn Phe
 420 425 430
 Thr Lys Leu Lys Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu
 435 440 445
 Cys Val Arg Gly Ile Ile Thr Ser Lys Arg Lys
 450 455

<210> 148

<211> 59

<212> PRT

<213> Artificial Sequence

<220>

<221> PEPTIDE

<222> (1)...(59)

<223> Peptide comprising a 6x His tag and S-tag

<400> 148

Met His His His His His His Ser Ser Gly Leu Val Pro Arg Gly Ser
 1 5 10 15
 Gly Met Lys Glu Thr Ala Ala Ala Lys Phe Glu Arg Gln His Met Asp
 20 25 30
 Ser Pro Asp Leu Gly Thr Asp Asp Asp Asp Lys Ala Met Gly Ser Phe
 35 40 45
 Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val
 50 55